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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,305	02/13/2004	Philip Neaves	501340.02 (30327/US)	7431

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EXAMINER

SMOOT, STEPHEN W

ART UNIT	PAPER NUMBER
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2813

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/779,305	Applicant(s) NEAVES, PHILIP	
	Examiner Stephen W. Smoot	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 17-22 is/are rejected.
- 7) ☒ Claim(s) 14-16 and 23-28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :2-13-04; 3-5-04; 5-17-04; 4-14-05; 6-23-05; 5-7-07.

DETAILED ACTION

This Office action is in response to applicant's amendment received on 26 December 2007.

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-28, and cancellation of non-elected claims 29-53 in the reply received on 26 December 2007 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 7-10, 12, 17-18, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Douglass (US 5,786,989 – from applicant's IDS received on 5-17-04).

Referring to Figs. 3-4 and column 4, line 16 to column 6, line 27, Douglass discloses a capacitively coupled structure that includes an upper chip (302) with capacitor plates (308) (i.e. pads) that are aligned in a mirror image pattern with corresponding capacitor plates (316) of a lower chip (314) to transmit signals by capacitive coupling from the upper chip (302) to the lower chip (314). The capacitor plates (308, 316) can be metal plates like copper or aluminum. The capacitor plates (308, 316) are covered with insulating layers (313, 318) that can be silicon dioxide. The upper chip (302) includes a transmitter circuit and the lower chip (314) includes a receiver circuit as described in column 6, lines 21-27.

These are all of the limitations as set forth in claims 1-5, 7-10, 12, 17-18, 20 of the applicant's invention.

4. Claims 1-6, 8, 11-12, 17-19, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Weber et al. (US 5,818,112 – from applicant's IDS received on 5-17-04).

Referring to Figs. 1, 3 and column 3, line 4 to column 4, line 39, Weber et al. disclose a structure for transmitting signals by capacitive coupling between two neighboring semiconductor chips (L_n , L_{n+1}). Each chip (L_n , L_{n+1}) includes an electrode (EL2, EL1) (i.e. pads) that are in alignment for transmitting signals by capacitive coupling. The electrodes (EL2, EL1) can be metal or polysilicon and are separated by insulating layers (OX, BOX, K) that can include silicon dioxide (i.e. the OX and BOX layers) as shown in Fig. 3. One chip (L_n) includes a transmission stage (S) positioned laterally to the electrodes (EL2, EL1) for transmitting signals to the other chip (L_{n+1}),

which includes a laterally positioned reception stage (E) for receiving the signals as shown in Fig. 1.

These are all of the limitations as set forth in claims 1-6, 8, 11-12, 17-19 of the applicant's invention.

Regarding claim 21, Weber et al. indicate that the electrodes (EL1, EL2) can have an area corresponding to 1000 square μm (also see column 6, lines 20-22), which implies a width dimension of about 30 square μm (that is, a square electrode would have a side of about 30 square μm or a circular electrode would have a diameter of about 30 square μm).

5. Claims 1-5, 7-10, 12, 17-18, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Doyle et al. (US 2001/0039075 A1 – from applicant's IDS received on 5-17-04).

Referring to Fig. 1A and paragraphs [0014] to [0023], Doyle et al. disclose a structure for capacitively coupling signals between two semiconductor devices (100, 120) that includes contact pads (101, 102) corresponding to one of the semiconductor devices (100) in alignment with contact pads (121, 122) corresponding to the other semiconductor device (120). The aligned contact pads (101, 102, 121, 122) are separated by a dielectric layer (108) that can be silicon dioxide. The contact pads (101, 102, 121, 122) can be metal pads like copper or aluminum. One of the semiconductor devices (100) includes a driver (i.e. a transmitter) for transmitting signals in the form of

voltage spikes by capacitive coupling between the pads (101, 102, 121, 122) to the other semiconductor device (120), which has a receiver for receiving the signals.

These are all of the limitations as set forth in claims 1-5, 7-10, 12, 17-18, 20 of the applicant's invention.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doyle et al. (US 2001/0039075 A1 – from applicant's IDS received on 5-17-04) as applied to claim 1 above.

As shown above, Doyle et al. anticipate claim 1 of the applicant's invention. However, although Doyle et al. are open to other dielectric materials besides silicon dioxide, they do not expressly teach or suggest silicon nitride, which is the further limitation to claim 1 as set forth in claim 13 of the applicant's invention. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute silicon nitride for the silicon dioxide layer of Doyle et al. because silicon nitride is a well known dielectric material with a higher dielectric constant than that of

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silicon dioxide and can, therefore, be advantageously substituted in order to increase capacitance.

8. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weber et al. (US 5,818,112 – from applicant's IDS received on 5-17-04) as applied to claim 17 above.

As shown above, Weber et al. anticipate claim 17 of the applicant's invention. However, Weber et al. do not expressly teach or suggest an electrode thickness of about 0.85 μm , which is the further limitation to claim 17 as set forth in claim 22 of the applicant's invention. It would have been obvious to a person of ordinary skill in the art at the time the invention was made, absent a showing of unexpected results by the applicant, to use electrodes with the as-claimed thickness through routine experimentation in order to discover the optimum or workable electrode thickness ranges corresponding to the structure of Weber et al. [see *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)].

Allowable Subject Matter

9. Claims 14-16, 23-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: Claims 14-16, 23-28 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a system in package device that includes first and second semiconductor devices with corresponding first and second pads that are configured to capacitively communicate signals between the two semiconductor devices, wherein a guard ring is positioned adjacent to at least one of pads.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prokoflev et al. and Knight et al. teach structures that feature capacitive coupling between semiconductor devices.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on Monday to Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen W Smoot/
Primary Examiner
Art Unit 2813

SWS